

## CLAIMS

What is claimed is:

1. A router bit system, comprising:

a bit including a cutting head and a shank, the shank having an annular groove formed therein; and

a router bit holding assembly including:

    a chuck having a bore for receiving the shank, the chuck having an opening radially formed therein;

    a ball received in the opening for engaging the annular groove of the shank when the shank is received in the bore;

    a collar concentrically disposed about the chuck, the collar sliding axially between a first position and a second position,

wherein the collar is moved to the first position for holding the ball in engagement with the annular groove and moved to the second position for allowing the ball to be disengaged from the annular groove.

2. The router bit system as claimed in claim 1, further comprising a spring assembly for biasing the collar to the first position.

3. The router bit system as claimed in claim 2, wherein the spring assembly comprises a compression spring, the compression spring being compressed as the collar is moved to the second position.

4. The router bit system as claimed in claim 1, wherein the shank includes a first end and a second end, the first end being coupled to the cutting head and the second end being tapered for facilitating insertion into the bore.

5. The router bit system as claimed in claim 4, wherein the bore is

tapered for receiving the second end of the shank.

6. The router bit system as claimed in claim 1, wherein the shank includes a first end and a second end, the first end being coupled to the cutting head and the second end being shaped for engagement with the chuck when the shank is received in the bore to at least substantially prevent rotation of the shank within the bore.

7. The router bit system as claimed in claim 6, wherein the second end comprises a slot formed therein, and the chuck includes a pin extending through the bore for engaging the slot when the shank is received in the bore.

8. The router bit system as claimed in claim 1, wherein the collar comprises an internal annular tapered groove for biasing the ball inwardly within the opening in the chuck when the collar is moved to the first position.

9. A router bit holding assembly for receiving a bit including a cutting head and a shank, the shank having an annular groove formed therein, comprising:

a chuck having a bore for receiving the shank, the chuck having an opening radially formed therein;

a ball received in the opening for engaging the annular groove of the shank when the shank is received in the bore;

a collar concentrically disposed about the chuck, the collar sliding axially between a first position and a second position,

wherein the collar is moved to the first position for holding the ball in engagement with the annular groove and moved to the second position for allowing the ball to be disengaged from the annular groove.

10. The router bit holding assembly as claimed in claim 9, further

comprising a spring assembly for biasing the collar to the first position.

11. The router bit holding assembly as claimed in claim 10, wherein the spring assembly comprises a compression spring, the compression spring being compressed as the collar is moved to the second position.

12. The router bit holding assembly as claimed in claim 9, wherein the bore is tapered for receiving the second end of the shank, the shank including a first end and a second end, the first end being coupled to the cutting head and the second end being tapered for facilitating insertion into the bore.

13. The router bit holding assembly as claimed in claim 9, wherein the chuck engages the shank when the shank is received in the bore to at least substantially prevent rotation of the shank within the bore.

14. The router bit holding assembly as claimed in claim 13, wherein chuck includes a pin extending through the bore for engaging a slot formed in the shank when the shank is received in the bore.

15. The router bit holding assembly as claimed in claim 9, wherein the collar comprises an internal annular tapered groove for biasing the ball inwardly within the opening in the chuck when the collar is moved to the first position.

16. A router bit, comprising:  
a cutting head for performing a cutting operation on a work piece; and  
a shank coupled to the cutting head for providing attachment of the router bit to the  
bit holding assembly of a router, the shank having an annular groove formed  
therein;  
wherein the bit holding assembly of the router engages the annular groove of the

shank when the shank is received in the bit holding assembly for securing the router bit within the bit holding assembly.

17. The router bit as claimed in claim 16, wherein the bit holding assembly receiving the shank comprises:

a chuck having a bore for receiving the shank, the chuck having an opening radially formed therein;

a ball received in the opening for engaging the annular groove of the shank when the shank is received in the bore;

a collar concentrically disposed about the chuck, the collar sliding axially between a first position and a second position,

wherein the collar is moved to the first position for holding the ball in engagement with the annular groove and moved to the second position for allowing the ball to be disengaged from the annular groove.

18. The router bit as claimed in claim 17, wherein the bit holding assembly further comprises a spring assembly for biasing the collar to the first position.

19. The router bit as claimed in claim 18, wherein the spring assembly comprises a compression spring, the compression spring being compressed as the collar is moved to the second position.

20. The router bit as claimed in claim 17, wherein the collar comprises an internal annular tapered groove for biasing the ball inwardly within the opening in the chuck when the collar is moved to the first position.

21. The router bit as claimed in claim 16, wherein the shank includes a first end and a second end, the first end being coupled to the cutting head and the second end being tapered for facilitating insertion into the bit holding assembly.

22. The router bit as claimed in claim 21, wherein the bit holding assembly includes a bore tapered for receiving the second end of the shank.

23. The router bit as claimed in claim 16, wherein the shank includes a first end and a second end, the first end being coupled to the cutting head and the second end being shaped for engagement with the bit holding assembly when the shank is received in the bit holding assembly to at least substantially prevent rotation of the shank within the bit holding assembly.

24. The router bit as claimed in claim 23, wherein the second end comprises a slot for engaging a pin within the bit holding assembly.

25. A router, comprising:  
a bit including a cutting head and a shank, the shank having an annular groove formed therein; and  
a bit holding assembly including:  
a chuck having a bore for receiving the shank, the chuck having an opening radially formed therein;  
a ball received in the opening for engaging the annular groove of the shank when the shank is received in the bore;  
a collar concentrically disposed about the chuck, the collar sliding axially between a first position and a second position,  
wherein the collar is moved to the first position for holding the ball in engagement with the annular groove and moved to the second position for allowing the ball to be disengaged from the annular groove.

26. The router as claimed in claim 25, further comprising a spring assembly for biasing the collar to the first position.

27. The router as claimed in claim 26, wherein the spring assembly comprises a compression spring, the compression spring being compressed as the collar is moved to the second position.

28. The router as claimed in claim 25, wherein the shank includes a first end and a second end, the first end being coupled to the cutting head and the second end being tapered for facilitating insertion into the bore.

29. The router as claimed in claim 28, wherein the bore is tapered for receiving the second end of the shank.

30. The router as claimed in claim 25, wherein the shank includes a first end and a second end, the first end being coupled to the cutting head and the second end being shaped for engagement with the chuck when the shank is received in the bore to at least substantially prevent rotation of the shank within the bore.

31. The router as claimed in claim 30 wherein the second end comprises a slot formed therein, and the chuck includes a pin extending through the bore for engaging the slot when the shank is received in the bore.

32. The router as claimed in claim 25 wherein the collar comprises an internal annular tapered groove for biasing the ball inwardly within the opening in the chuck when the collar is moved to the first position.

33. A router bit system, comprising:  
a bit including a cutting head and a shank, the shank having an annular groove formed  
therein; and  
a bit holding assembly including:

means for receiving the shank;  
means for engaging the annular groove of the shank when the shank is received in the receiving means; and  
means for causing the engaging means to engage the annular groove.

34. A bit system, comprising:

a bit including a cutting head and a shank, the shank having an annular groove formed therein; and

a bit holding assembly including:

a chuck having a bore for receiving the shank, the chuck having an opening radially formed therein;

a ball received in the opening for engaging the annular groove of the shank when the shank is received in the bore;

a collar concentrically disposed about the chuck, the collar sliding axially between a first position and a second position,

wherein the collar is moved to the first position for holding the ball in engagement with the annular groove and moved to the second position for allowing the ball to be disengaged from the annular groove.

35. The bit system as claimed in claim 34, further comprising a spring assembly for biasing the collar to the first position.

36. The bit system as claimed in claim 35, wherein the spring assembly comprises a compression spring, the compression spring being compressed as the collar is moved to the second position.

37. The bit system as claimed in claim 34, wherein the shank includes a first end and a second end, the first end being coupled to the cutting head and the second end being tapered for facilitating insertion into the bore.

38. The bit system as claimed in claim 37, wherein the bore is tapered for receiving the second end of the shank.

39. The bit system as claimed in claim 34, wherein the shank includes a first end and a second end, the first end being coupled to the cutting head and the second end being shaped for engagement with the chuck when the shank is received in the bore to at least substantially prevent rotation of the shank within the bore.

40. The bit system as claimed in claim 39, wherein the second end comprises a slot formed therein, and the chuck includes a pin extending through the bore for engaging the slot when the shank is received in the bore.

41. The bit system as claimed in claim 34, wherein the collar comprises an internal annular tapered groove for biasing the ball inwardly within the opening in the chuck when the collar is moved to the first position.

42. A router bit holding assembly for receiving a bit including a cutting head and a shank, the shank having an annular groove formed therein, comprising:

a chuck having a bore for receiving the shank, the chuck having an opening radially formed therein;

a ball received in the opening for engaging the annular groove of the shank when the shank is received in the bore;

a collar concentrically disposed about the chuck, the collar sliding axially between a first position and a second position for holding the ball in engagement with the annular groove in the first position and allowing the ball to be disengaged from the annular groove in the second position;

a collar lock coupled to the collar for fixing the axial position of the collar,

wherein the collar lock is positionable between a locked position for fixing the collar into holding the ball into engagement with the annular groove and a disengaged position for permitting axial sliding of the collar.

43. The router bit holding assembly as claimed in claim 42, wherein the collar lock is a biased pin lock.

44. The router bit holding assembly as claimed in claim 42, wherein the collar lock includes:

a pushbutton for manipulating the collar lock between the engaged and disengaged positions;

an engaging pin, connected to the pushbutton, said engaging pin slidably coupled generally perpendicular to a main axis of the chuck, for engaging the chuck;

means for biasing the engaging pin into engagement with the chuck.

45. The router bit holding assembly as claimed in claim 44, wherein the collar includes an aperture tangential to the chuck for receiving the engaging pin therein.

46. The router bit holding assembly as claimed in claim 44, wherein the engagement pin is generally hourglass-shaped.

47. The router bit holding assembly as claimed in claim 44, wherein the biasing means is disposed between the collar and the pushbutton.

48. The router bit holding assembly as claimed in claim 42, wherein the collar lock is a twist lock.

49. The router bit holding assembly as claimed in claim 42, wherein the collar lock includes:

a protrusion extending from at least one of an outer surface of the chuck and inwardly from an inner surface of the collar,

wherein at least one of the chuck and the collar includes a generally L-shaped recess, opposing the protrusion, for limiting axial sliding of the collar.

50. The router bit holding assembly as claimed in claim 49, wherein the generally L-shaped recess is orientated such that rotation of the bit holding assembly forces the protrusion into engagement with the tail portion of the L-shaped recess.

51. The router bit hold assembly as claimed in claim 49, wherein the protrusion is a set screw.

52. A router bit holding assembly for receiving a bit including a cutting head and a shank, the shank having an annular groove formed therein, comprising:

a chuck having a bore for receiving the shank, the chuck having an opening radially formed therein;

a ball received in the opening for engaging the annular groove of the shank when the shank is received in the bore;

a collar concentrically disposed about the chuck, the collar sliding axially between a first position and a second position for alternatively holding the ball in engagement with the annular groove in the first position and allowing the ball to be disengaged from the annular groove in the second position;

means for locking the collar so as to fix the collar in the first position.

53. A router bit system, comprising:

a bit including a cutting head and a shank, the shank having an annular groove formed

therein; and

a bit holding assembly including:

- means for receiving the shank;
- means for engaging the annular groove of the shank when the shank is received in the receiving means;
- means for causing the engaging means to engage the annular groove; and
- means for locking the causing means to fix engagement of the engaging means with the annular groove.